A COLONY OF *WILLIAMSONIA FLETCHERI* (ODONATA: CORDULIIDAE) DISCOVERED IN MASSACHUSETTS[1]

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ABSTRACT: A population of *Williamsonia fletcheri* is described from the vicinity of Brooks Pond located in central Massachusetts. This represents the second record of this species from this state and the only colony reported from the United States; all previous U.S. records represent isolated individuals. Mature adults were found on or near the ground in sunlit areas within the forest surrounding the pond. A summary of the known North American distribution of *W. fletcheri* is provided.

Wiliamsonia fletcheri Williamson is one of the smallest North American corduliids and certainly one of the rarest. Adults are normally encountered in the vicinity of select bogs during their brief spring flight period. The known distribution of this species embraces a considerable territory with published records from the Canadian provinces of New Brunswick, Quebec, Ontario and Manitoba (Walker and Corbett, 1975). In the United States, specimens exist from New York (Beatty and Beatty 1969), Michigan (Foley 1966, Gloyd 1932), Maine (Montgomery 1943, White and Morse 1973), New Hampshire (White 1978) and Massachusetts (Davis 1940). However, within this extensive range *W. fletcheri* apparently is extremely restricted in habitat with extant records represented almost exclusively by single individuals and many capture dates occurring prior to 1940. The only locality where *W. fletcheri* has been encountered with regularity is the Mer Bleue, a peat bog in Ontario, Canada (Walker and Corbett 1975). The sole specimen of *W. fletcheri* stemming from Massachusetts is a teneral male captured in Shirley, Middlesex Co. on May 19, 1939 (Davis 1940). This individual was misidentified as *Williamsonia lintneri* (Hagen) in the original reference and subsequently reassigned to *W. fletcheri* by Montgomery (1943). After a 45 year hiatus, I report here the discovery of a new population of *W. fletcheri* from a site in central Massachusetts.

Habitat Description

Adult *W. fletcheri* were observed in wooded areas abutting Brooks Pond (42°30'N; 72°12'E; elev. 230m) located in the Harvard Forest near Petersham, Worcester Co. MA. Brooks Pond is a typical boreal pond about

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50 ha in area with boggy margins. Clumps of leatherleaf *(Chamaedaphne calyculata)* and highbush blueberry *(Vaccinium corymbosum)* dot the southern end of the pond and grade progressively into an extensive thicket which overlies a sphagnum mat and envelops most of the northern portion of the pond. An open sphagnum bog supporting isolated clumps of American larch and black spruce lies to the north of a dirt road which cuts across the northern end of the pond. The surrounding forest consists primarily of eastern hemlock, red maple and various oak species with a sparse, predominately herbaceous understory. During early to mid June the pond and associated bog areas are cohabited by a diverse array of Anisopterans including *Tetragoneuria canis* Maclachlan, *Leucorrhinia hudsonica* (Selys), *Gomphus borealis* Needham and a large population of *Libellula julia* Uhler. As well, three teneral *Aeshna mutata* Hagen were observed flying along the edge of a clearing located near the S.E. corner of the pond. It is not known whether a breeding population is established at this site.

Behavioral Observations and Population Size

Three mature male *W. fletcheri* were observed on June 4, 1984 perched on the ground beneath trees at the edge of a sand pit located near the S.E. corner of Brooks pond. One of these individuals was captured and positively identified using the keys of Needham and Westfall (1955). A thorough search of this area as well as the pond margins and bog failed to divulge any additional individuals. However, on June 7, 1984 an intensified search of the wooded areas adjacent to the open bog at the northern end of the pond revealed the presence of a number of *W. fletcheri.* Here mature adults of both sexes perched in small sunlit areas within the forest, usually on low-lying foliage or on the ground and more rarely on tree trunks. Individuals that were not disturbed tended to remain in these areas for several minutes occasionally engaging in short flights to investigate or capture small insects and then either returning to the original spot or moving a few meters to another sunlit area. Conversely, disturbed individuals would fly rapidly and erratically over the forest floor for distances upwards of 20m or fly up into the trees. Under these conditions their small size, dark coloration and erratic movements rendered observation extremely difficult.

To obtain an estimate of population density, a *ca.* 4 ha., approximately triangular area delimited on two sides by dirt roads and on the other by the open bog was visually censused on foot at midday. On June 7, 8 and 10, 1984 between 20 and 25 *W. fletcheri* were noted each day in this area. Since the dragonflies were not captured it was not possible to determine whether certain individuals were counted more than once although an effort was made to avoid areas where flushed individuals had flown. This area was surveyed once more on June 18 but inexplicably and despite ideal warm,

sunny conditions, no adults were found. Several individuals were also sighted in other scattered wooded locations surrounding the pond although no attempt was made to census these areas. Three males were captured on June 7, 1984 and donated to museum collections[3]; the male collected on June 4, 1984 and a female captured on June 7, 1984 remain in the author's private collection.

Discussion

Because superficially suitable habitat is scattered over much of central and western Massachusetts and New England, it is conceivable that additional populations of *W. fletcheri* will be discovered within this region, particularly if search efforts focus on wooded areas surrounding bog habitats. The challenge will lie in determining the particular aquatic microhabitats necessary for successful larval development as the availability of such conditions probably is a major factor limiting the distribution of this species.

The existence of a colony of *W. fletcheri* provides a singular opportunity to add to our scant knowledge of its life history, virtually all aspects of which remain undescribed. As well, the larval form and its habitat requirements await discovery. In fact, it was only as recently as 1970 that the larva of *Williamsonia lintneri,* the only other representative of this genus, was described by White and Raff (1970) from specimens collected in a bog in Norfolk, Co. Massachusetts. As in *W. fletcheri,* adult *W. lintneri* typically are encountered in wooded areas and on paths adjacent to suitable bogs. Mating occurs in these areas and gravid females fly alone into the open bog and oviposit there unattended by males (Charlton, unpublished). Given the propensity for mature *W. fletcheri* to remain for prolonged periods in forested sites, it is possible that a similar mating system is operative for this species. Further detailed studies of adult reproductive and population biology as well as ecological data on the immature stages are prerequisite to implementing meaningful conservation programs for this rare and potentially threatened species.

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